

What is claimed is:

1. A microlithographic projection lens having a system diaphragm arranged in a region of a last bulge on an image side, and having an image-side numerical aperture of more than 0.65 and an image field diameter of more than 20 mm, wherein a pupil plane is curved over a cross section of a pencil of rays by a maximum of 20 mm.
2. A microlithographic projection lens according to claim 1, wherein said pupil plane is curved by a maximum of less than 15 mm.
3. A microlithographic projection lens having a system diaphragm arranged in a region of a last bulge on an image side, and having an image-side numerical aperture of more than 0.65 and an image field diameter of more than 20 mm, wherein the lens has a telecentricity deviation of less than  $\pm 4$  mrad of a geometric central beam, on stopping down to 0.8 times said image-side numerical aperture.
4. A microlithographic projection lens according to claim 3, wherein said telecentricity deviation is less than  $\pm 3$  mrad.
5. A microlithographic projection lens having a system diaphragm arranged in a region of a last bulge on an image side, and having an image-side

numerical aperture of more than 0.65 and an image field diameter of more than 20 mm, wherein a tangential image dishing of a pupil image in a diaphragm space is corrected to less than 20 mm.

6. The microlithographic projection lens according to claim 5, wherein the tangential image dishing of the pupil image in the diaphragm space is corrected to less than 15 mm.
7. A projection lens according to claim 1, wherein a first negative lens that follows the pupil plane in a beam path is a meniscus that is concave on a pupil side.
8. A projection lens according to claim 1, wherein a lens group of negative refractive power is arranged at each waist, and a lens group of positive refractive power is arranged at each bulge, and wherein at least two positive lenses of a lens group of a third bulge are arranged before the pupil plane.
9. The projection lens according to claim 8, wherein at least three of the positive lenses are arranged before the pupil plane.
10. The projection lens according to claim 1, wherein at least one spherically overcorrecting air space is arranged between adjacent lenses in a region of a third bulge before the pupil plane.

102320-40527650

11. The projection lens according to claim 1, wherein a lens with an aspheric surface is arranged before a first waist.
12. The projection lens according to claim 1, wherein a second waist comprises only spherical lenses.
13. The projection lens according to claim 1, wherein quartz glass and fluoride crystals, individually or in combination, are used as lens material.
14. The projection lens according to claim 13, wherein the crystals comprise particularly  $\text{CaF}_2$ ,  $\text{BaF}_2$ ,  $\text{SrF}_2$ ,  $\text{LiF}$ .
15. The projection lens according to claim 1, comprising two waists and three bulges.
16. A microlithographic projection exposure device comprising a projection lens according to claim 1.
17. A process for producing microstructured components, comprising the steps of:  
  
exposing a substrate provided with a photosensitive layer with ultraviolet light via a mask and a projection exposure device according to claim 11, and  
  
if necessary, after development of the photosensitive layer, the substrate is structured corresponding to a pattern contained on the mask.

18. The process according to claim 16, comprising several exposures with at least one of different kinds of illumination and numerical apertures.

09917504-072704